

CSCAPE 2005: NOAA Ship *David Starr Jordan*

Weekly Science Report – Leg 6

3 November 2005, Sarah L. Mesnick – Cruise Leader

SCIENCE SUMMARY: 27 October – 3 November 2005

This week's weekly begins where last week's ended – with a killer whale sighting at the mouth of the Columbia River. Observers were unveiling the big eyes and firing up the computers for another leg at sea when the whales were spotted near the sea buoy. After a flurry of photographs, a flurry of emails with killer whale researchers back on land confirms that both sightings were of southern resident type killer whales. The data are important because researchers have long questioned where these animals go in the fall and winter when they leave the San Juan Island area. The CSCOPE photos confirm the pods' association with the Columbia River and suggest that Chinook salmon producing river systems influence the distribution of the population. These sightings also demonstrate the value added of collaboration between our large scale surveys and the dedicated surveys of researchers studying the finer scale movements of killer whales in the Pacific Northwest. See the photo summary below for more details; kudos to photographers Holly Fearnbach, Cornelia Oedekoven and Laura Morse.

The joy of being on Leg 6 means that the Cruise Leader inherits a well-oiled machine run by a synchronized team of scientists, crew and command that works well together. Oceanographers Candy Hall and Liz Zele commanded the heavy bongo net last night over the side in 12-15' seas as if it was a stroll down the road, with Joao Alves driving the winch on the back deck, and XO Paul Kemp and Navigation Officer Sean Kinney, maneuvering the ship into position. The photo/biopsy team emerges in a flash out of nowhere once a sighting is made and the flying bridge and bridge team intuit each others calls at times.

With no major operational issues to deal with, and as every Cruise Leader who has come before has written, the rest turns out to be all about the weather. We were delayed two days in Astoria, Oregon, due to weather, departing on the 29th of October at 0730 to cover tracklines in both coastal and offshore areas off Washington and Oregon. The forecast area is a dynamic one this time of year and local weather can be strikingly different from that predicted. The passing cold fronts march through these waters one after another, but it's difficult to predict the tempo and thus, how much of a window may develop between fronts that is workable. Thanks to the back-home weather team, Jim Carretta, Eric Archer and Sarah Jackson, for their help.

Biological highlights of the week included several small groups of bowriding northern right whale dolphins. One group included a mother with calf, swimming so close together that the first impression was of a large remora. A juvenile blue whale, surrounded by rooster-tailing Dall's porpoises, swam onto its side several times, mouth and ventral grooves agape, beside the ship. Laysan and Black-footed Albatross dominated the skies in the high winds, while smaller birds and birders struggled to keep in position below. The last sighting of the week had something for everyone - a large mixed school Pacific white-sided dolphins and northern right whale dolphins, accompanied by twelve different species of birds, and fish below.

Social highlights for the week included a costume contest and Halloween games conceived by Laura Morse and Cornelia Oedekoven. The steward department went all out on decorations and baked treats – 2nd Cook Mike Sapien’s singing Halloween guinea pigs on each table in the mess were a particular hit.

The only operational bugaboos were flickering monitors on the flying bridge, first the mammal computer, then the birder computer. The culprit seems to be water reaching the cabling. Chief ET Kim Belveal was called to the flying bridge so many times, we put him in the observer rotation.

Welcome to visiting scientists Natalie Spear and Nicole Hedrick, who writes about the “frozen zoo project” below, and to returning scientists Jim Gilpatrick and Thomas Staudt. Stay tuned next week for news from California.

Sightings and Effort Summary for Marine Mammals

Date	Start Stop	Position	Total Distance	Avg. Beaufort
103005	1209	N46:16.98 W124:14.04	36.1 nmi	3.4
	1754	N46:34.29 W124:54.64		
			0.0 nmi	6.0
103005	1209	N46:16.98 W124:14.04	36.1 nmi	3.4
	1754	N46:34.29 W124:54.64		
			0.0 nmi	6.0
103105	1146	N45:35.47 W127:40.41	17.0 nmi	5.7
	1711	N44:56.81 W127:52.92		
110105	0831	N44:55.38 W127:44.31	2.6 nmi	5.8
	0849	N44:53.23 W127:46.27		
110205	0713	N42:28.59 W126:54.05	69.7 nmi	3.6
	1702	N42:06.64 W125:17.34		

CODE	SPECIES	TOT#
022	Lagenorhynchus obliquidens	1
027	Lissodelphis borealis	11
037	Orcinus orca	2
044	Phocoenoides dalli	11
051	Mesoplodon sp.	1
070	Balaenoptera sp.	2
075	Balaenoptera musculus	1
076	Megaptera novaeangliae	2
096	unid. cetacean	1
TOTAL		32

Biopsies (Gary Friedrichsen and Laura Morse)

Species	27 Oct – 2 Nov	CSCAPE cumulative
Minke whale		1
Humpback whale		21
Blue whale		8
Fin whale		1
Sperm whale		11
Baird's beaked whale		2
Short-beaked common dolphin		111
Pacific white-sided dolphin	4	26
Northern right whale dolphin	4	10
Striped dolphin		2
Dall's porpoise	3	16
Killer whale		5
Risso's dolphin		4
All species	11	218

“Frozen Zoo” Project (Nicole Hedrick)

New this year to the marine mammal cruises is the collection of fresh tissue from the biopsies for cell culture. This is a collaborative project with The San Diego Zoo's Conservation and Research for Endangered Species (CRES). CRES houses the largest “frozen zoo” in the world – a collection of live cells, cultured in a lab from different species' tissues. The growing CSCAPE collection is a representative sample of a wide range of families: Balaenopteridae, Ziphiidae, Delphinidae, and Phocoenidae. By adding marine mammals to the “frozen zoo,” we are contributing to the preservation of some of our favorite species for future generations.

Cell-culture Report (Laura Morse, Tim O'Toole, and Nicole Hedrick)

Species	27 Oct- 02 Nov	CSCAPE cumulative
Blue whale		1
Baird's beaked whale		1
Pacific white-sided dolphin	1	1
Striped dolphin		1
Dall's porpoise	1	1
All species	2	5

Photo Project (Cornelia Oedekoven, Holly Fearnbach and Kathy Hough)

This week's photo effort was quite limited due to poor weather conditions, but there were definitely some highlights. Last week's photo-id section included a photo taken from a killer whale sighting on our way into Astoria. Robin Baird, of Cascadia Research, alerted Brad

Hanson at NWFSC of the sighting and it was determined that this animal was a member of K pod from the southern resident community. As Sarah mentioned above, we encountered another group of killer whales in almost the exact location on our first day of effort for leg 5, just outside the mouth of the Columbia River. The group was very surface active, allowing for several close photo approaches. These photos were then sent to both Brad Hanson at NWFSC and folks at the Center for Whale Research, an organization that has been monitoring southern resident killer whales for 30 years. Individuals from this sighting were determined to be from two southern resident pods, K and L. The L pod members were part of a six animal matriline that regularly associates with K pod. The fall and winter movement patterns of the southern residents have been a major question for researchers and these two sightings provide further evidence of their movement into Oregon waters during fall months, and possibly confirm a suggested association with the Chinook salmon run in the Columbia River. CSCAPE has now provided three sightings of southern resident killer whales in waters outside of the San Juan Islands.



Above are two photographs taken from the second killer whale sighting, DSJ1451, on October 29, 2005. The animal on the left is a member of K-pod, K11, while the animal on the right is a member of L-pod, L79. Both photos were taken by Laura Morse.

Other highlights of the week include a humpback whale id, a juvenile blue whale id, and photos from several small groups of bowriding northern right whale dolphins (including a cow/neonate) and a large, mixed school of Pacific white-sided and northern right whale dolphins. Hopefully the seas will calm and the animals will appear to allow for a more diverse photo report next week!

Photo summary (10/29/05-11/03/05):

Species	# Schools Photographed	# Individuals Photographed
Killer whales		9
Humpback whale		1
Northern right whale dolphin	3	
Pacific white-sided dolphin	1	
Blue whale		1

Seabird Report (Rich Pagen and Thomas Staudt)

For a short week of survey time, we certainly have a lot to report. Since the mammal folks were unable to work most of the time due to weather and wind conditions, we predict that their section of this weekly report may be a bit slim – so we'll give you the WHOLE seabird story.

After passing through the Common Murres, Buller's Shearwaters, and assorted gulls on our way northwest out of Astoria, we spent some time in abominable seas with intermittent rain accompanied by Northern Fulmars, Cassin's Auklets, and small numbers of Fork-tailed Storm-Petrels. By about 1430 on October 30th, "Mischief night" had set in and the rain, wind and swell shut down even us intrepid Birders for the remainder of the day. Halloween morning began with the ship tacking back and forth in a generally southwestern direction (searching for a comfortable ride for all aboard), still at the mercy of the northwest swell and Beaufort 6 winds. At 0955 (at Lat. 45.789, Long. -127.505), we sighted the first of the 20 Mottled Petrels we would encounter over the next three days [there was one other Mottled Petrel seen at the Halloween costume party, but we decided to not include that one in our totals as some of its field marks (i.e., the six inch long red bill made out of cardboard and tape) were questionable]. Five of these birds were photographed (special thanks go out to Laura Morse, Cornelia Oedekoven and the rest of mammal folks who helped us, to quote Peter Pyle, "man the Canons").

Our biggest highlight of the week was as many as six Murphy's Petrels on the 31st (one photographed – see photo below), one Murphy's Petrel and three Solander's/Murphy's Petrels on the 1st (one photographed), and three Murphy's Petrels on the 2nd (two photographed).

Solander's/Murphy's Petrels are birds that were not identified to species, but narrowed down to one of these two species.

Murphy's Petrels are regularly seen off western North America in the spring, but these October/November records appear to be unprecedented. Our team of experts is picking apart the photos as we speak to confirm the ID of these birds. Stay tuned!



Murphy's Petrel photographed 150 miles off Cape Falcon, Oregon on Halloween Day, 2005 (Photo by Rich Pagen).

Also of interest this week were the large numbers of Laysan Albatross encountered in these same waters where the aforementioned petrels were found. For example, on the 1st, we counted 77 individuals, of which 58 came into our 300 m survey zone. On that same day, 30 Black-footed Albatross were counted, 27 of which were in our survey zone. Many a camera shutter was heard clicking as a constant entourage of albatross was accompanying the ship. Other noteworthy happenings included a Green-winged Teal and a Cassin's Auklet found on the deck, and a fly-by Northern Pintail.

Oceanographic Operations (Candice Hall & Liz Zele)

The topic of this week is weather, weather and more weather! Not only did it drastically affect our departure from Astoria but also it has severely influenced our operational abilities. The upside is that we now have a ship full of budding physical oceanographers and meteorologists, as many aboard try to predict the future swell height and wind strength.

Sfc Wind (knots) / MSLP (mb) / 500 – 1000 mb Thickness (dm)

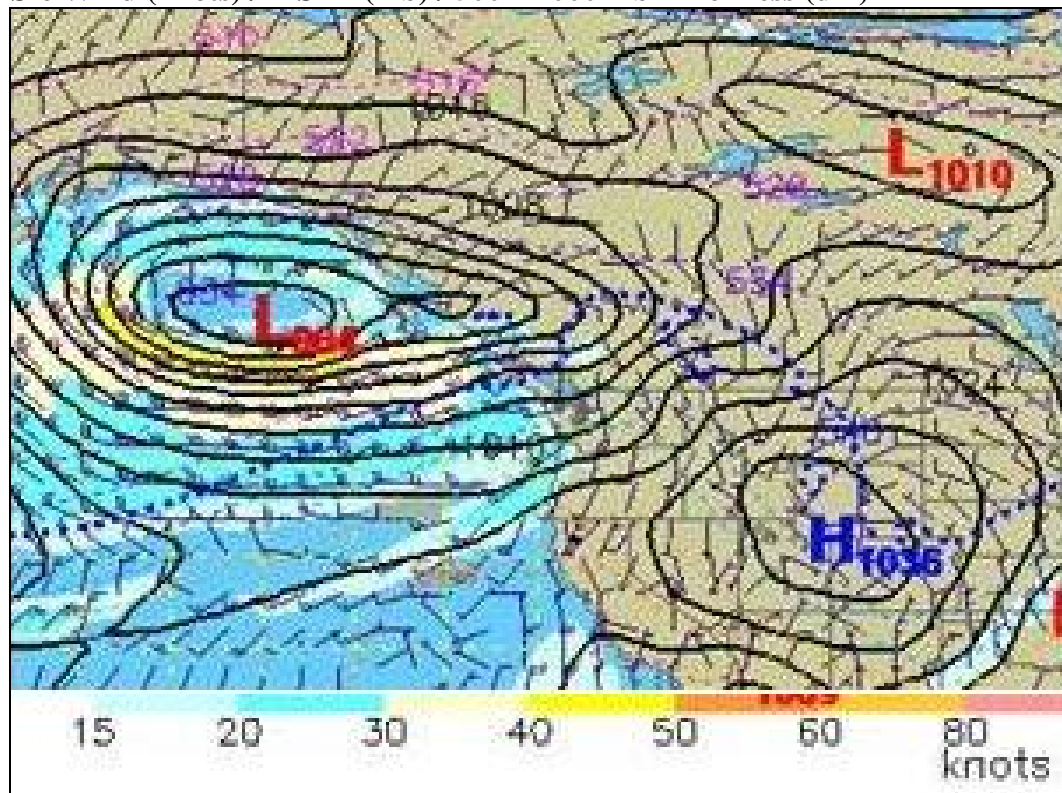


Figure 1: 24-hour weather as forecasted by UCAR at 1200z on the 30 October 2005. (See <http://www.rap.ucar.edu/weather/model> for the full plot including legend).

Figure 1 above depicts the weather forecasted on 30 October for the 31 October, predicting high wind speeds that made us hold our breaths to see how our dear Jordan handled herself! Figure 2 shows the wind speeds that we actually experienced over the 31 October and 01 November, showing that the projections of sustained 35-45 knot winds, with gusts to 48 knots per hour were pretty much spot on! Also, note the rapid rise and fall in wind speed, which shows the fast and furious nature of the passing cold frontal systems in this area.

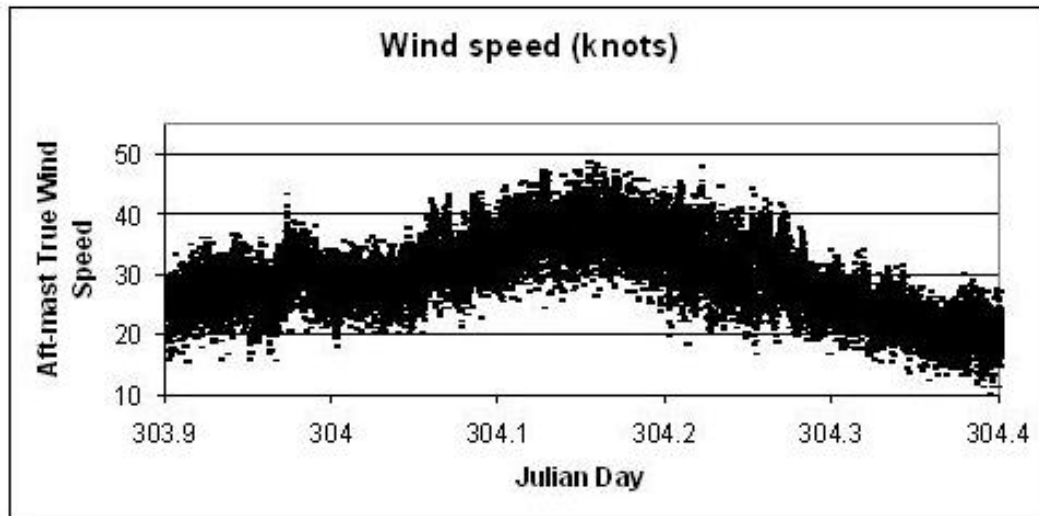


Figure 2: True wind speed (knots) as recorded on 31st October and 1st November 2005. (DSJ Aft Mast wind recorder, plotted by Candice Hall).

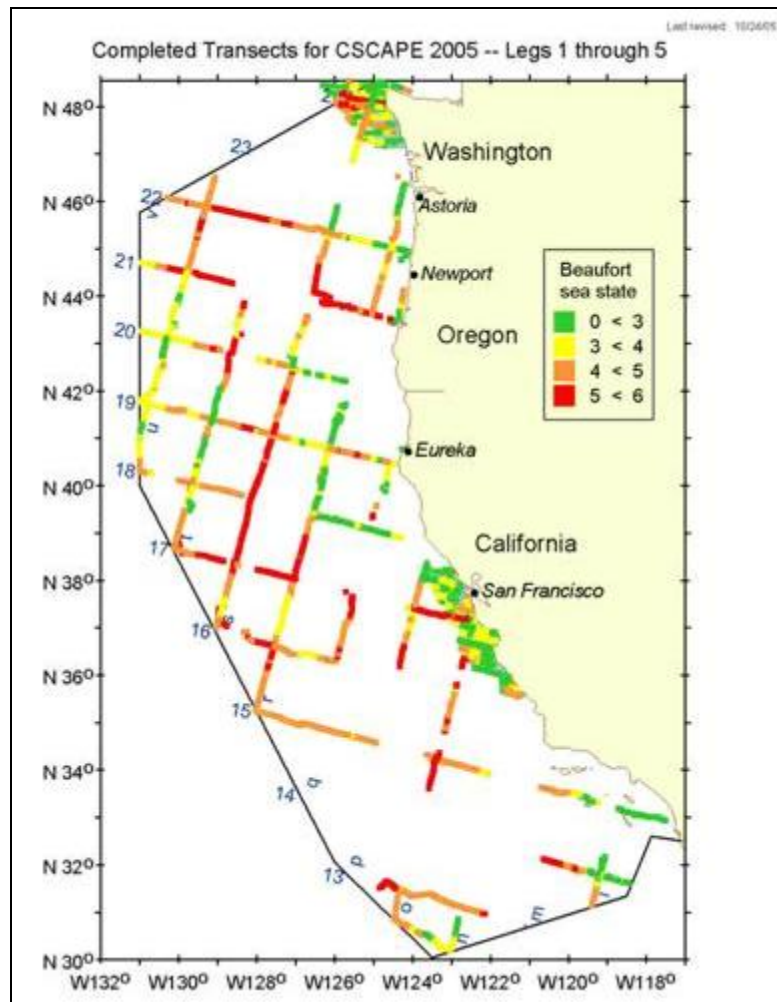


Figure 3: Beaufort sea state of completed transects for CSCAPE 2005. Legs 1 – 5 (Plot: Karin Forney).

It is within the Westerly wind region (Latitudes 30° - 65°) that we have conducted our survey. Figure 3 below shows the Beaufort Sea State that we have experienced during CSCAPE 2005 so far. It is quite noticeable that most of our track lines were surveyed in conditions of Beaufort 4 and above, substantiating the influence of winds on these latitudes during the survey months.

Moral of my story: if anyone is going to Alaska soon, now's the perfect time to put a message in a bottle, as these storms are advancing at quite a speed (as shown by the rapid increase in wind speed in figure 2)!

Date	CTD's	XBT's	Bongo Tows	Comments
10/24 – 10/28				In port – Astoria.
10/29	0	0	1	Departed from Astoria.
10/30	1	2	0	Weather reduced operations.
10/31	0	1	1	Weather reduced operations.
11/01	1	1	1	Weather reduced operations.
11/02	0	3	0	SAB (Storm avoidance behaviour)!

Squeakly Report (Liz Zele and Laura Morse)

Though affected by weather delays and lazy in port, we did manage to derive some acoustics from our subjects! Both before and after our time in Astoria, OR, we encountered a relatively smaller group of killer whales, whose components are suggested to be from two southern resident groups. While on the bow of the Jordan, the group whistled and echolocated. Additionally, during the second encounter we managed to obtain some low intensity call recordings from a successful sonobuoy! My work here is done...!